providing an array of electrodes that is proximate to a substrate surface, said surface being proximate to one or more molecules bearing at least one protected chemical functional group attached thereto,

providing a buffering or scavenging solution in contact with the substrate at a concentration from about 1 mM to about 100 mM;

selectively deprotecting at least one protected chemical functional group on at least one of said molecules;

bonding a first monomer having at least one protected chemical functional group to one or more deprotected chemical functional groups of said molecule;

selectively deprotecting a chemical functional group on the bonded molecule or another of said molecules bearing at least one protected chemical functional group;

bonding a second monomer having at least one protected chemical functional group to a deprotected chemical functional group of the bonded molecule or said other deprotected molecule; and

repeating the selective deprotection of a chemical functional group on a bonded protected molecule or a bonded protected molecule and the subsequent bonding or an additional monomer to said deprotected functional group until at least two separate polymers of desired length are formed on the substrate surface wherein during said selective deprotection steps, and electric potential is applied to one or more selected electrodes sufficient to generate electrochemical reagents at the selected electrodes capable of deprotecting the chemical functional groups on said proximate molecules or monomers.

In claim 39 line 1, please delete "17" and insert therefore --16--.

(Twice Amended) A method for electrochemical synthesis of an array of separately formed oligonucleotides on a substrate, which comprises the steps of:

providing an array of electrodes that is proximate to a substrate surface, said surface being proximate to one of more molecules bearing at least one protected chemical functional group attached thereto, and further providing a buffering or a scavenging solution in contact with the substrate at a concentration from about 1 mM to about 100 mM;

selectively deprotecting at least one protected chemical functional group on at least one of said molecules, bonding a first nucleotide having at least one protected chemical functional group;

bonding a second nucleotide having at least one protected chemical functional group to a deprotected chemical functional group of the nucleotide bonded molecule or said other deprotected molecule; and

repeating the selective deprotection of a chemical functional group on a protected bonded nucleotide or a protected bonded molecule and the subsequent bonding of an additional nucleotide to said